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D. RemarksObjection to Claim 18.

3 The claims have been amended to address this objection. Claim 17 has been reinstated and claim 18 has been cancelled.

Rejection of Claims 1-3, 5-9, 10-13, 15-16 and 18-20 Under 35 U.S.C. §103(a), based on U.S. Patent No. 6,014,979 (Van Autryve et al.) in view of Applicant's Background Art (Background Art).

10 The rejection of claims 1-3 and 5-9 will first be addressed.

The invention of amended claim 1 is directed to a method of cleaning a plasma reactor chamber part, of a material redistributed thereon by a reactive plasma process, by placing the chamber part in a redistributed material solvent for at least 6 hours, cleaning the chamber part with a plasma that includes oxygen as a source gas, and ultrasonically cleaning the chamber part.

15 As is well known, to establish a prima facie case of obviousness, a rejection must meet three basic criteria. First, there must be some suggestion or motivation to modify a reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference(s) must teach or suggest all claim limitations.

20 The cited combination of references does not show the limitation of "ultrasonically cleaning a chamber part" as recited in claim 1. None of the references relied upon in rejecting claim 1 mentions ultrasonically cleaning, thus such a step cannot be shown. Applicant's *Background Art* does not mention ultrasonically cleaning in the conventional plasma chamber part cleaning process.¹ Similarly, *Van Autryve et al.* never mentions ultrasonic cleaning.²

25 To show such a limitation, the rejection relies on the following reasoning

[Using] ultrasonic to enhance liquid cleaning... was well-known and conventional in the art. It would have been obvious to apply ultrasonic during liquid cleaning... to enhance the cleaning with reasonable expectation of adequate

¹ A review of the Background of the Invention of Applicants' Specification does not teach ultrasonically cleaning.

² A review of *Van Autryve et al.*, including a word search, provides no mention of ultrasonic cleaning.

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results.³

Applicants request a citation for the basis of this reasoning. If such reasoning is based on official notice, Applicants seasonably traverse, and request a reference in support. Absent such a showing, a prima facie case of obviousness cannot exist, as the requisite suggestion/motivation has not been shown.

For this reason alone, the rejection of claims 1-3 and 5-9 is traversed.

In addition or alternatively, as noted above, Applicants' claim 1 recites the limitation of "placing the chamber part in a redistributed material solvent for at least 6 hours". Such a time limitation is not shown in or suggested by the references. The references clearly teach away from such relatively long solvent cleaning time.

Applicants' *Background Art* teaches away from extended solvent cleaning times. The following was previously presented as clear evidence in support of this point.

A wet clean of H_2O_2 and NH_2OH may etch quartz surfaces changing surface textures. Changes in chamber part surfaces may result in drift in an etch process, as a changing surface conditions may alter gas flows and or etch chemistry. Further, because cleaning may consume etch chamber parts, such parts may have to be periodically replaced.⁴

To address this showing the final rejection relies on the following reasoning.

This is not persuasive because of the following: first, most of the claims are silent regarding the material of the part; second, none of the claims required cleaning in the ammonia peroxide solution; third, the prior art teaches the use of acetone; fourth, even in the case of ammonia peroxide solution and the quartz part, the time

³ See the Final Office Action, dated 6/3/03, Page 4, Lines 16-20.

⁴ See the Applicants' Specification, Page 3, Lines 9-13.

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needed to dissolve contamination depends on the level of contamination. It would have been obvious... to perform cleaning until the contaminants are removed.⁵

5 These rebuttal arguments will be addressed in order, and shown to be insufficient to establish a prima facie case of obvious.

The first and second reasons are *per se* improper. Applicants are arguing against the combination of references. Thus, it is not understood how the rejection can rely on claim language to support the combination of *Van Autryve et al.* in view of the *Background Art*. The necessary motivation for an obviousness rejection must come from the prior art and not from the
10 claims.

With respect to the third reason, that the prior teaches the use of acetone, such a teaching is not suggestive of a 6 hour cleaning. Applicants have assumed that the rejection is referring to the very limited teachings of *Van Autryve et al.* The single mention of acetone in the entire reference is set forth below:

15

In the wet-cleaning process, the process chamber 25 is opened to atmosphere, and scrubbed by an operator using an acid or solvent, such as acetone or aqua regia, to scrub off and dissolve accumulated process residue on the process chamber surfaces.⁶

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Applicants believe that the above teaching of scrubbing with acetone cannot show or suggest placing a chamber part in acetone for 6 hours. Still further, a consideration of *Van Autryve et al.* as a whole, clearly shows that the reference teaches away from such a duration.

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In the competitive semiconductor industry, the increased cost per substrate that results from the extended process chamber downtime during the wet-cleaning and seasoning process steps, is highly undesirable. Also, the wet-cleaning and seasoning process often provide inconsistent and variable properties. In particular, because the wet-cleaning process is manually performed by an operator, it often

⁵ See the Final Office Action, dated 6/3/03, Page 5, last two lines to Page 6, Line 5.

⁶ *Van Autryve et al.*, Col. 11, Lines 12-16.

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varies from one session to another, resulting in variations in process chamber surface properties and low process reproducibility. Thus it is desirable to have a cleaning process that can quickly and reliably remove the process residue formed on the surfaces of the collar.⁷

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Thus, *Van Autryve et al.* clearly teaches away from the claimed cleaning time.

With respect to the fourth reason, Applicants respectfully request a citation in support of this reason. If this reasoning is based on official notice, Applicants timely traverse and request a reference in support. Absent such a showing, a prima facie case of obviousness cannot be established.

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For this additional reason, this ground of rejection is traversed.

The rejection of claims 10-13 will now be addressed.

The invention of amended claim 10 is directed to a method of cleaning a plasma reactor chamber part. The method includes plasma cleaning a chamber part of a material redistributed on the chamber part by a reactive plasma process, with a plasma having an etch selectivity between the chamber part and the redistributed material that is greater than 1:100. The method also includes cleaning the chamber part with a solvent of the redistributed material by placing the chamber part in the solvent of the redistributed material.

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As noted above, and well understood, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art.

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To show the necessary motivation for combining *Van Autryve et al.* in view of the *Background Art*, the rejection relies on the following reasoning.

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It would have been obvious... to perform wet cleaning in *Van Autryve et al.* by any conventional way to achieve better cleaning.⁸

⁷ *Van Autryve et al.*, Col. 2, Lines 39-51.

⁸ See the Office Action, dated 6/3/03, Page 4, Lines 8-12.

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This reasoning cannot be from the cited art as it contradicts the express teachings of *Van Autryve et al.* *Van Autryve et al.* explicitly states that wet cleaning is not better cleaning. As cited previously above:

5 [D]owntime during the wet-cleaning... is highly undesirable... wet-cleaning often provide[s] inconsistent and variable properties... it often varies from one session to another, resulting in variations in process chamber surface properties and low process reproducibility...⁹

10 Thus, the references are not believed to provide the necessary motivation to modify an undesirable step.

The rejection of claims 15-16 and 18-20 will now be addressed.

15 The invention of claim 15 is directed to a method of cleaning reactive plasma chamber parts. The method includes the steps of applying an organic solvent to a surface of a chamber part, oxygen plasma cleaning the chamber part, and ultrasonically cleaning the chamber part after the oxygen plasma cleaning.

20 To the extent that this ground of rejection relies on the combination of *Van Autryve et al.* in view of the *Background Art*, the comments set forth above for claims 10-13 are incorporated by reference herein. Namely, that motivation for the proposed combination is lacking.

Further, the comments set forth above for claims 1-3 and 5-9 are incorporated by reference herein. Namely, that the limitation of an ultrasonic cleaning step is not shown or suggested by the cited references.

25 Additionally, Applicants submit herewith, in Appendix A, the definition of the verb "place" to clarify the plain meaning of Applicants' claim limitations that recite placing a chamber part in a solvent, and the like.

⁹ *Van Autryve et al.*, Col. 2, Lines 39-51.

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Claims 1, 6, 7, 9, 10 and 19 have been amended. Claims 5, 8 and 18 have been cancelled. Applicants' amendments represent the incorporation of limitations from cancelled dependent claims into the base claim.

5 Accordingly, these amendments place the claims in better form for appeal, and cannot raise any new issues for consideration.

The present claims 1-3, 6-7, 9, 10-13, 15-17 and 19-20 are believed to be in allowable form. It is respectfully requested that the application be forwarded

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Respectfully Submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**APPENDIX A****5 Merriam-Webster's Collegiate® Dictionary, Eleventh Edition****Main Entry: ¹place****Function: *verb*****Inflected Form(s): placed; plac ing****10 Date: 15th century*****transitive senses*****1 a : to put in or as if in a particular place or position**